

**KEITHLEY INSTRUMENTS**

---

**Model 7066 Relay Switch Card  
Instruction Manual**

**Contains Operating and Servicing Information**

**Publication Date: February 1990  
Document Number: 7066-901-01 Rev. B**

**Instruction Manual  
Model 7066  
Relay Switch Card**

# SPECIFICATIONS

## MODEL 7066 RELAY SWITCH CARD

**CHANNELS PER CARD:** 10

**CONTACT CONFIGURATION:** 2-pole, Form A or Form B (jumper selectable).

**CONNECTOR TYPE:** Quick disconnect screw terminals, No. 14 AWG maximum wire size.

**RELAY DRIVE CURRENT:** 80mA per relay typical.

**MAXIMUM SIGNAL LEVEL:** 250V DC or RMS, 350V peak. 2A DC or RMS. 60W DC, 125VA AC (resistive load).

**CONTACT LIFE:** 10<sup>8</sup> closures (cold switching); 10<sup>5</sup> closures (at maximum signal level).

**CONTACT RESISTANCE:** <0.1Ω initial, <2Ω to rated life.

**CONTACT POTENTIAL:** <30µV per contact pair, input to output with copper leads (<10µV typical).

**ACTUATION TIME:** <3ms, exclusive of mainframe.

**CHANNEL ISOLATION:** >10<sup>9</sup>Ω.

**INPUT ISOLATION:** >10<sup>9</sup>Ω

**COMMON MODE VOLTAGE:** 350V peak.

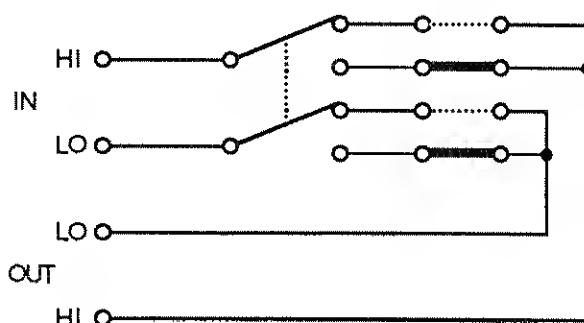
### ENVIRONMENT,

**Operating:** 0° to 50°C, up to 35°C at 70% R.H.

**Storage:** -25° to 65°C.

**DIMENSIONS, WEIGHT:** 32mm high × 114mm wide × 272mm long (1¼" × 4½" × 10¾"). Net weight 0.28kg (10 oz.).

### EACH CHANNEL :



Provides 10 channels of 2-pole switching, with a quick disconnect terminal block for each channel.

Configuration is DPST-N.O. (Form A). Normally closed connection is available by moving jumpers.

Specifications subject to change without notice.

# TABLE OF CONTENTS

## SECTION 1—GENERAL INFORMATION

1.1	INTRODUCTION .....	1-1
1.1.1	Product Description .....	1-1
1.1.2	Manual Overview .....	1-1
1.2	WARRANTY INFORMATION .....	1-2
1.3	MANUAL ADDENDA .....	1-2
1.4	SAFETY SYMBOLS AND TERMS .....	1-2
1.5	UNPACKING AND INSPECTION .....	1-3

## SECTION 2—OPERATION

2.1	INTRODUCTION .....	2-1
2.2	SAFETY PRECAUTIONS .....	2-1
2.3	WIRING .....	2-1
2.3.1	NO and NC Jumpers .....	2-3
2.3.2	DPST Configuration .....	2-3
2.3.3	Terminal Block Configuration .....	2-5
2.3.4	Other Configurations .....	2-8
2.4	INSTALLATION AND REMOVAL .....	2-12
2.4.1	Relay Card Installation .....	2-13
2.4.2	Relay Card Removal .....	2-13
2.5	OPERATION .....	2-13
2.6	TYPICAL APPLICATIONS .....	2-23
2.6.1	Switching Sources and Supplies .....	2-23
2.6.2	Switching Loads .....	2-24
2.6.3	Other Applications .....	2-25

## SECTION 3—SERVICING INFORMATION

3.1	INTRODUCTION .....	3-1
3.2	REQUIRED TEST EQUIPMENT .....	3-1
3.3	ENVIRONMENTAL CONDITIONS .....	3-1
3.4	VERIFICATION PROCEDURE .....	3-2

## SECTION 4—REPLACEABLE PARTS

4.1	INTRODUCTION .....	4-1
4.2	REPLACEABLE PARTS .....	4-1
4.3	ORDERING INFORMATION .....	4-1
4.4	FACTORY SERVICE .....	4-1
4.5	COMPONENT LAYOUT and SCHEMATIC DIAGRAM .....	4-2

## LIST OF TABLES

### SECTION 2—OPERATION

2-1	Four-Pole Jumper Configuration .....	2-11
2-2	Scanner Control of Model 7066 4-Pole Mode ...	2-16
2-3	Scanner Control of Model 7066 2-Pole Mode ...	2-16
2-4	Scanner Control of Model 7066 1-Pole Mode ...	2-17
2-5	Scanner Control of Model 7066 Matrix Mode (0-Pole) .....	2-19

### SECTION 3—SERVICING INFORMATION

3-1	Recommended Test Equipment .....	3-1
-----	----------------------------------	-----

### SECTION 4—REPLACEABLE PARTS

4-1	Model 7066, Parts List .....	4-2
-----	------------------------------	-----

# LIST OF ILLUSTRATIONS

## SECTION 2—OPERATION

2-1	Jumper Positions for NO and NC Operation . . . . .	2-4
2-2	DPST Configuration . . . . .	2-5
2-3	Quick Disconnect Terminal Block . . . . .	2-6
2-4	Typical Wire Routing . . . . .	2-7
2-5	SPDT Configuration . . . . .	2-8
2-6	DPDT Configuration . . . . .	2-10
2-7	4PST Configuration . . . . .	2-12
2-8	Limiting Inductive Reaction Voltage . . . . .	2-21
2-9	Limiting Capacitive Reaction Current . . . . .	2-22
2-10	Clamping AC Mains Transients . . . . .	2-23
2-11	Switching Sources and Supplies . . . . .	2-24
2-12	Switching Loads . . . . .	2-25

## SECTION 3—SERVICING INFORMATION

3-1	Performance Verification Setup . . . . .	3-3
-----	--	-----

## SECTION 4—REPLACEABLE PARTS

4-1	Model 7066, Component Location Drawing . . . . .	4-3
4-2	Model 7066, Schematic Diagram . . . . .	4-5

# **SECTION 1**

## **GENERAL INFORMATION**

### **1.1 INTRODUCTION**

#### **1.1.1 Product Description**

The Model 7066 Relay Switch Card provides 10 separate channels using 10 two-pole relays. As shipped, the switches are configured for double-pole single-throw (DPST), normally open (NO) operation. Features of the relay switch card include:

- Quick disconnect terminal blocks for each channel.
- Moveable relay jumpers to configure any switch to be normally closed (NC).
- Separate, isolated IN/OUT circuits for each channel.

#### **1.1.2 Manual Overview**

The instruction manual is organized in the following manner:

- Section 1 General Information—Includes a product description and an overview of the manual, information on warranty, manual addenda, safety symbols and terms, unpacking and inspection, and specifications.
- Section 2 Operation—Includes safety information, wiring and installation, operating instructions, and some typical applications.
- Section 3 Performance Verification—Provides the procedure to check proper operation of the card.
- Section 4 Replaceable Parts—Includes a parts list, schematic diagram and a component layout.

## 1.2 WARRANTY INFORMATION

Warranty information is stated on the inside front cover of this manual. If there is a need for service, contact the Keithley representative or authorized repair facility in your area. Check the back cover for addresses. The service form supplied at the end of the manual should be used to provide the service facility with information concerning any difficulty.

## 1.3 MANUAL ADDENDA

Product improvements or changes to this manual will be explained on an addendum included with the manual. It is recommended that this information be incorporated immediately into the appropriate places in the manual.

If an additional instruction manual is required, order the manual package (Keithley Part Number 7066-901-00). The manual package includes an instruction manual and all pertinent addenda.

## 1.4 SAFETY SYMBOLS AND TERMS

The symbol  denotes that the user should refer to the operating instructions.

The symbol  denotes that a high voltage may be present on the terminal(s).

The **WARNING** used in this manual explains dangers that could result in personal injury or death.

The **CAUTION** used in this manual explains hazards that could damage the instrument.

## **1.5 UNPACKING AND INSPECTION**

The Model 7066 was inspected both electrically and mechanically before shipment. Upon receiving the Model 7066, unpack all items from the shipping carton and check for any obvious damage that may have occurred during transit. Report any damage to the shipping agent. Retain and use the original packaging materials in case reshipment is necessary. The following items are shipped with every Model 7066:

Model 7066 Relay Switch Card  
Model 7066 Instruction Manual

## **1.6 SPECIFICATIONS**

Detailed specifications of the Model 7066 precede the table of contents of this manual.

## **SECTION 2 OPERATION**

### **2.1 INTRODUCTION**

This section contains safety information, wiring instructions for the various relay configurations, an installation procedure of the card in a scanner, operating instructions, and some typical applications for the card.

### **2.2 SAFETY PRECAUTIONS**

1. Make sure the scanner mainframe is grounded through a properly earth grounded receptacle before operation.
2. Inspect all test lead connections for wear and defects such as cracks, exposed wires, (etc). Correct any defect found before operating the relay card with the mainframe.
3. Do not exceed the Model 7066's maximum allowable voltages as defined in the specifications.
4. Turn off all power supplies and discharge any residual power before installing or removing the Model 7066 from the scanner mainframe.
5. Turn off all power supplies and discharge any residual power before connecting or disconnecting wires and jumpers from the Model 7066.
6. The Model 7066 is not intended to directly switch high power mains circuitry. Switching low power mains circuitry is explained in paragraph 2-5.

### **2.3 WIRING**

Each channel on the Model 7066 consists of a two-pole relay that has a quick disconnect terminal block. As shipped, each relay is configured for double-pole single-throw (DPST), normally open (NO) operation. The relay card can be wired for different switch configurations as explained in this section.

**WARNING**

**To avoid electrical shock that could result in severe injury or death, always remove all power from external sources before making or breaking connections to the relay card.**

**CAUTION**

**When switching a circuit that approaches the current limit (2A) or a circuit with high fault current capability (such as AC mains), it is required that a 2A fuse be wired in series with the input to protect the card.**

**Peak transients must be clamped to <400V. See paragraph 2.5 for clamping information.**

Notes:

1. To maintain  $>10\Omega$  input isolation, keep the card and terminal blocks clean. Body oil and dirt from touching can degrade the isolation resistance.
2. To prevent overheating, do not place loads on the card. All loads should be outside of the scanner.
3. Shielding—Shielded cables should be used when switching above 50V or high current. The shield should be connected preferably to a guard circuit or to earth ground. This helps prevent excessive radiation from the cables from interfering with any equipment. The cable rating must exceed the maximum allowable signal levels as defined in the specifications.
4. RFI Filtering—RFI on inputs or outputs may cause problems with other cards installed in the scanner and with low level measurements. RFI filtering on these lines may be required in order to operate the cards to their full specifications.
5. Reactive loads require voltage clamping (for inductive loads) and current limiting (for capacitive loads). See paragraph 2.5 for more information.

### 2.3.1 NO and NC Jumpers

At the factory, both poles of each relay are configured for normally open (NO) operation. That is, the circuit is not closed until the relay is energized. The positions of the jumpers for NO operation are shown in Figure 2-1(A).

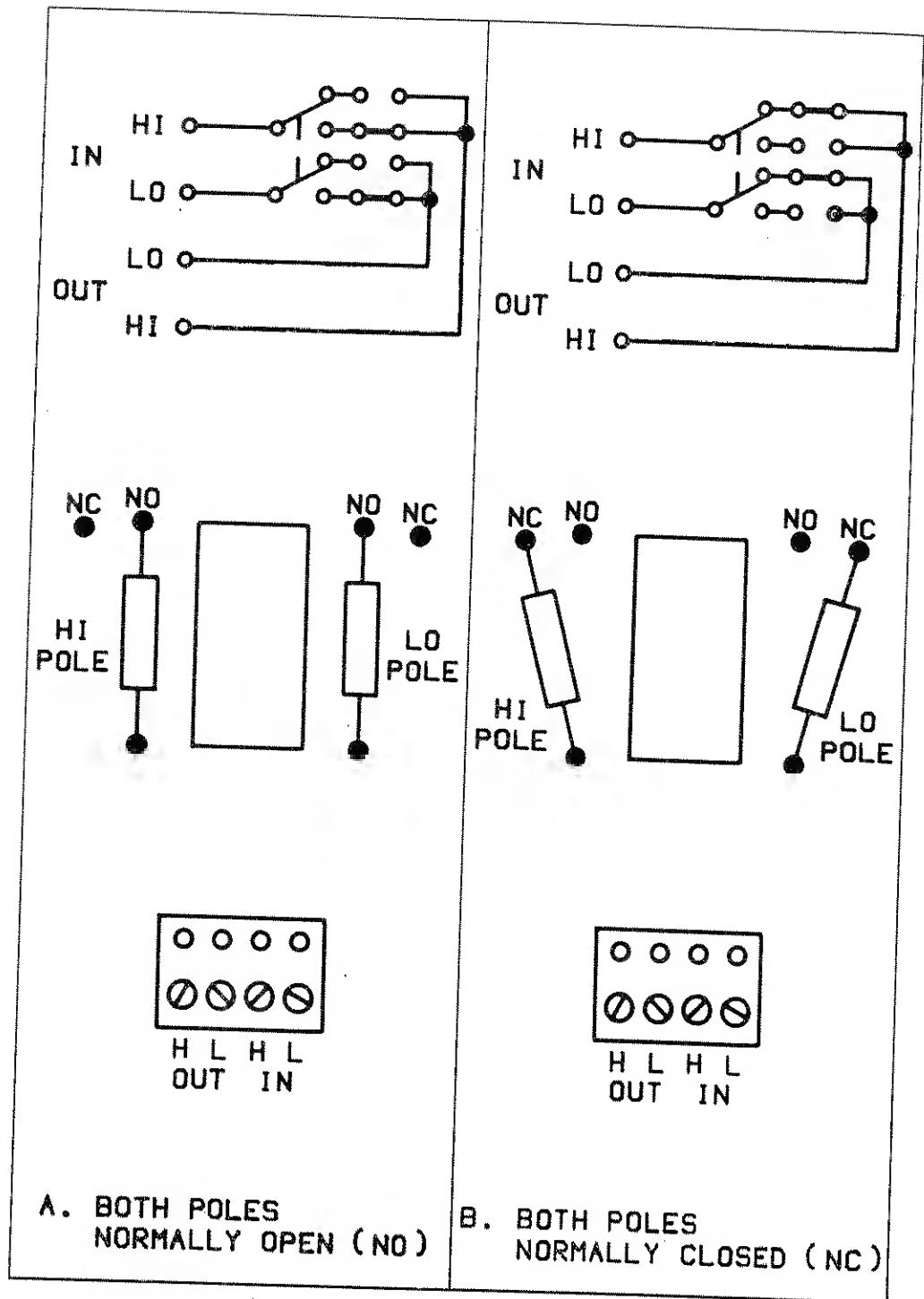
A pole of any relay channel can be configured to be normally closed (NC) by moving the jumper to the alternate position. In the NC configuration, the circuit is broken when the relay is energized. Figure 2-1(B) shows the position of the jumpers for configuring both poles of a relay for NC operation.

### 2.3.2 DPST Configuration

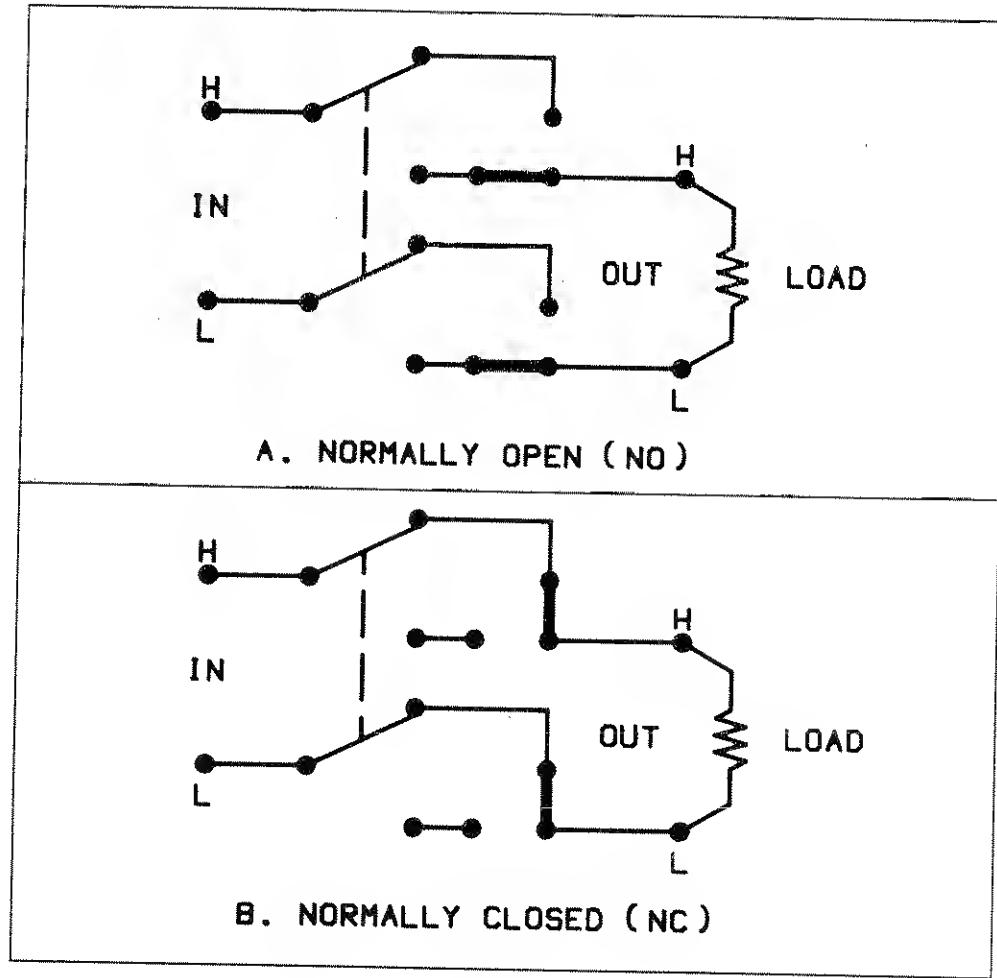
To use a channel in the double-pole single-throw (DPST) configuration, simply connect the source to the IN terminals of the terminal block and the load across the OUT terminals as shown in Figure 2-2. The procedure to make connections to the terminal block is provided in the next paragraph.

#### NOTE

The DPST configuration can be changed to a SPST configuration by connecting one of the loads to common. Thus, one pole of the relay is not used in that circuit.



**Figure 2-1. Jumper Positions for NO and NC Operation**



**Figure 2-2. DPST Configuration**

### 2.3.3 Terminal Block Connections

Perform the following procedure to wire circuitry to the terminal blocks of the Model 7066:

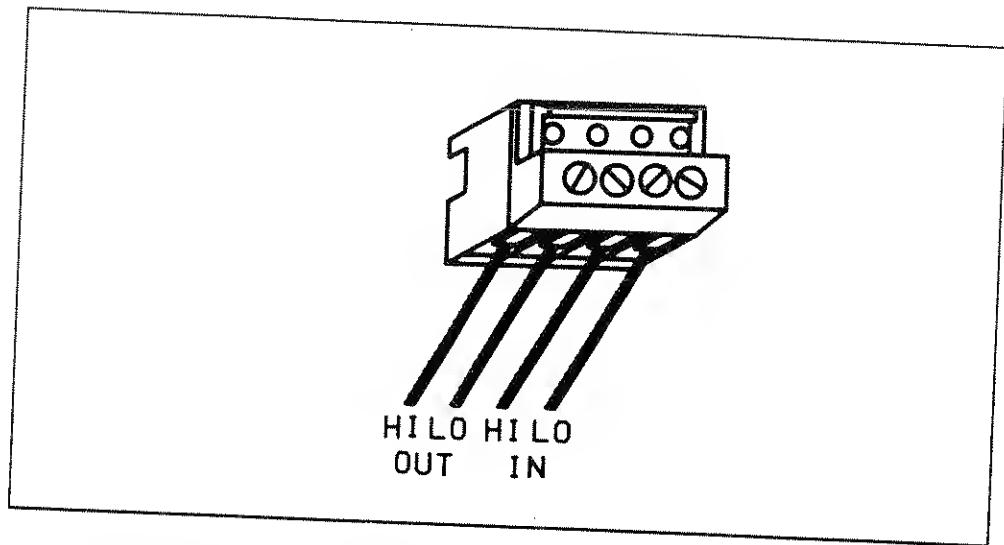
**WARNING**

Make sure all power is off and stored energy in external circuitry is discharged.

1. Remove the terminal block, for the appropriate channel, from the relay card by simply pulling it off the PC board.
2. Using an insulated screwdriver, connect the circuitry to the terminal block as shown in Figure 2-3. The screw terminals accept #14 to #26 AWG wire.
3. Reinstall the terminal block on the relay card. Make sure the pins on the card are properly mated to the terminal block.
4. Repeat steps 1 through 3 if it is desired to wire additional terminal blocks.
5. Referring to Figure 2-4, remove one screw from the cable clamp of the relay card and route the terminal block wires as shown.
6. Reassemble and tighten the cable clamp. The clamp serves as a strain relief for the terminal block wires.

**NOTE**

To order extra terminal blocks, order Keithley part number CS-521-3. See paragraph 4.3 for ordering information.



**Figure 2-3. Quick Disconnect Terminal Block**

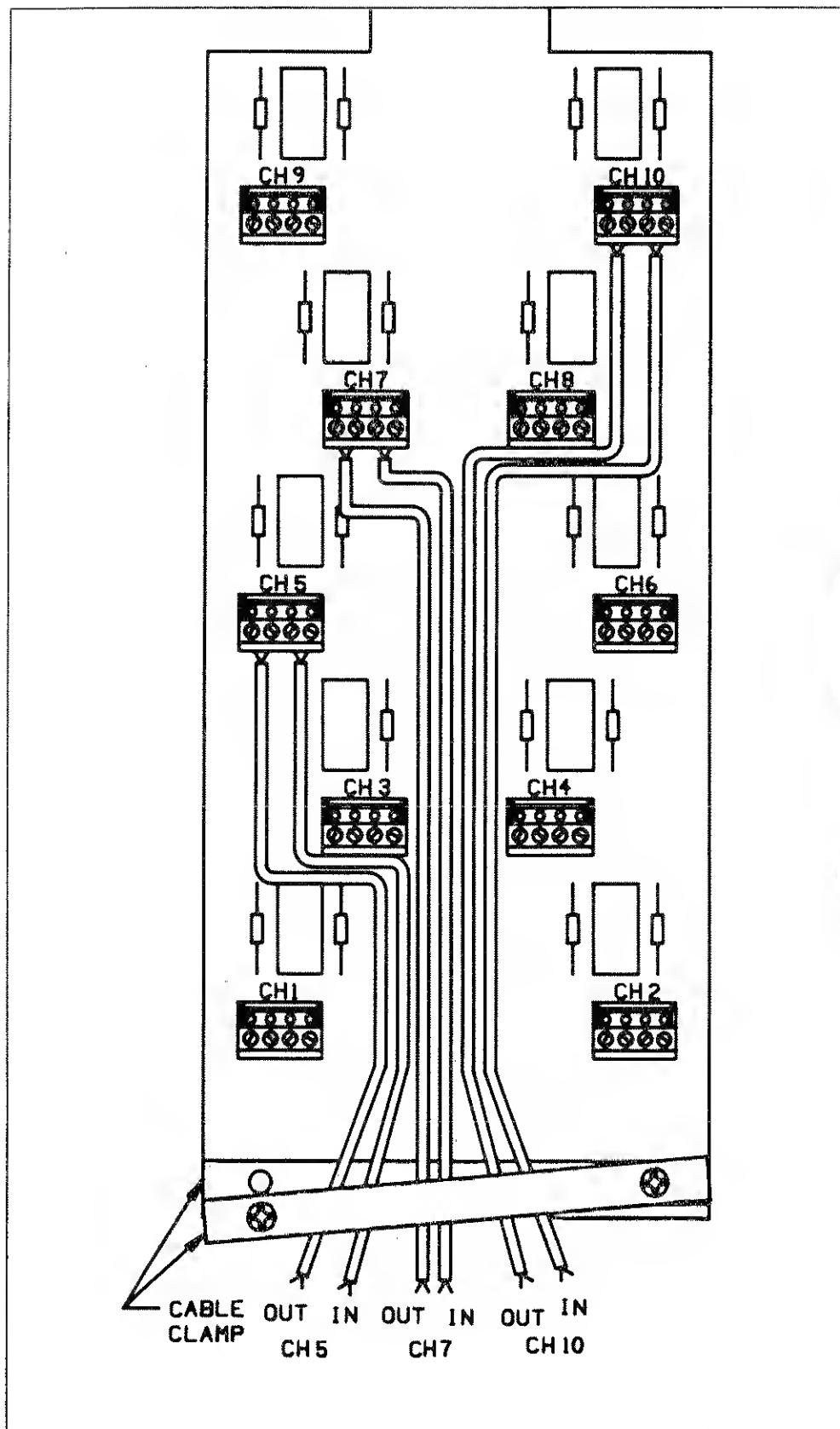


Figure 2-4. Typical Wire Routing

### 2.3.4 Other Configurations

A variety of different relay configurations can be set up.

**SPDT Configuration**—In this configuration, the relay switches a single-pole input from one load to another. Referring to Figure 2-5, wire the relay card as follows:

1. Cut or remove the normally open jumper of the high pole.
2. Add a jumper between the high pole and the normally closed position of the low pole.

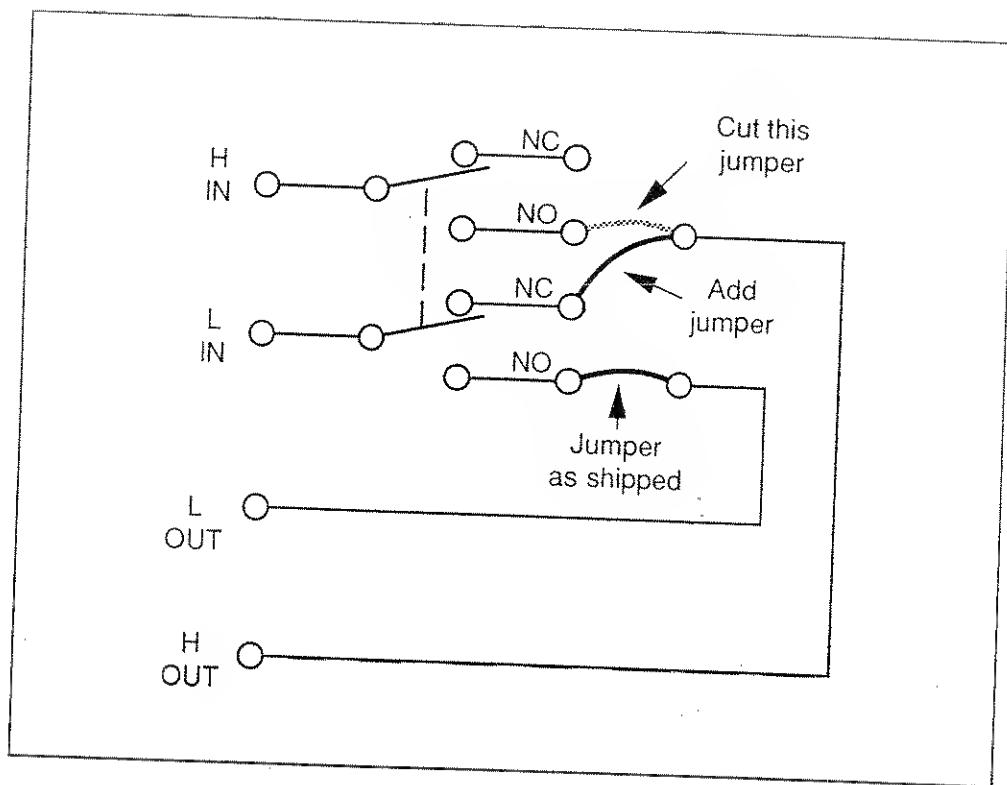


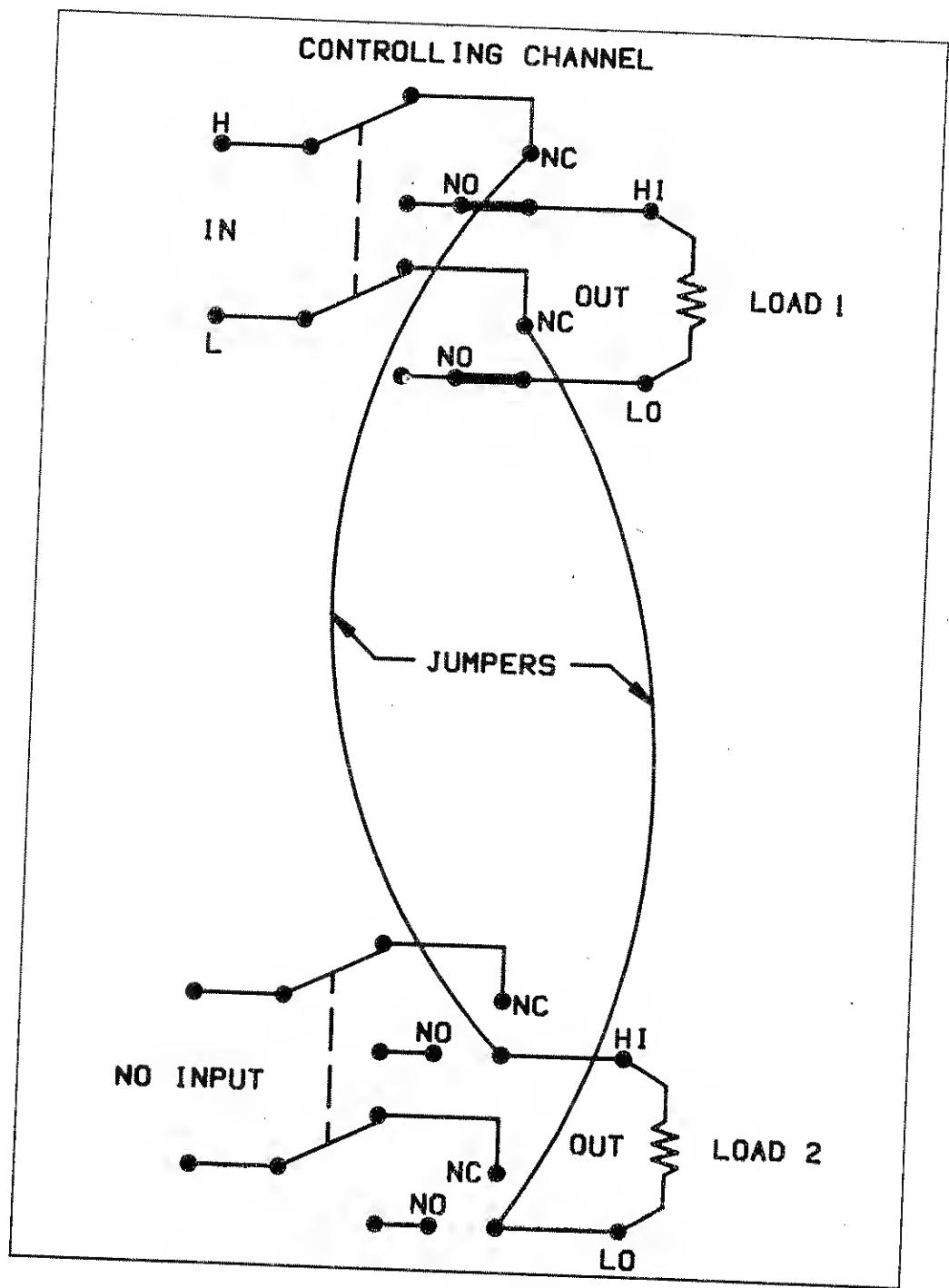
Figure 2-5. SPDT Configuration

**DPDT Configuration**—In this configuration, one relay is used to switch a double-pole input from one load to another. Referring to Figure 2-6, wire the relay card as follows:

1. On the controlling channel, set the relay jumpers to be normally open or normally closed. On the other channel, remove the relay jumpers.
2. Install jumpers from the controlling channel to the second channel as shown. Note: If the relay on the controlling channel is normally closed, run the jumpers from the NO side of the switches.
3. Wire the loads to the two channels and connect the input to the controlling channel.

**NOTE**

A 4PDT configuration can be accomplished by setting up another DPDT configuration and energizing both controlling relays simultaneously. Also, a 6PDT configuration is possible using three DPDT setups.



**Figure 2-6. DPDT Configuration**

**Four-Pole Configurations**—In this configuration, two relays are energized at the same time to control two separate circuits. Depending on how the relay jumpers are positioned, both loads, no loads or one load can be selected when the relays are energized. Figure 2-7 shows the 4PST-NO configuration with the relays normally open. Wire the relay card as follows:

1. Set the relay card jumpers as desired. Table 2-1 lists which load is connected to the input for the various relay jumper positions.
2. Connect the circuits to the two channels.

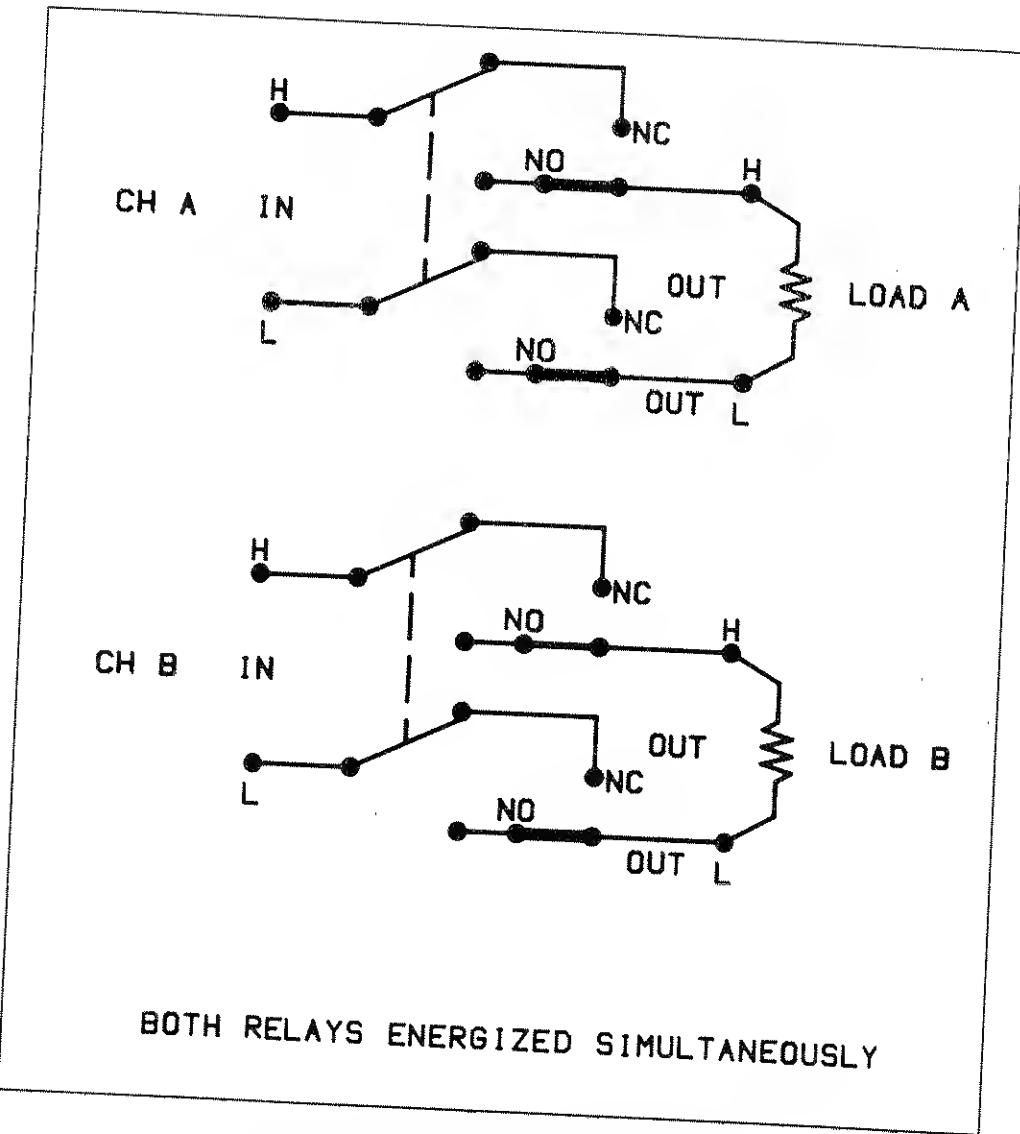
**NOTE**

6PST and 8PST configurations are possible by adding a third and fourth channel respectively.

**Table 2-1. Four-Pole Jumper Configuration**

Jumper Configurations		
Ch1	Ch2	Selected Load*
NO	NO	A, B
NC	NC	None
NO	NC	A
NC	NO	B

\*Both relays energized.



**Figure 2-7. 4PST Configuration**

## 2.4 INSTALLATION AND REMOVAL

**WARNING**  
 Make sure all power is off and stored energy in external circuitry is discharged.

### **2.4.1 Relay Card Installation**

Before installing the Model 7066 into the scanner mainframe, it must be wired with the desired configuration as explained in paragraph 2.3. Once the card is configured, plug it into the appropriate slot in the rear panel of the scanner mainframe. In the Model 705, the relay card is placed horizontally into the unit. In the Model 706, the relay card is placed vertically in the unit. The relay card is placed in the mainframe with the card edge first. Align the card with the grooves in the slot and insert the card to its full depth into the mainframe. Make sure the card is properly seated into the connector in the mainframe. With the card fully inserted, push the locking tabs forward to the center of the card to lock it in the mainframe.

**NOTE**

Refer to the scanner mainframe's instruction manual for complete details.

### **2.4.2 Relay Card Removal**

To remove a relay card, first turn off the mainframe and all other equipment connected to the card. Unfasten the locking tabs on the card by pulling the tabs outward. Grasp the end of the card and carefully pull it out of the mainframe.

## **2.5 OPERATION**

**WARNING**

User supplied lethal voltage may be present on the PC board or the connectors. Maximum voltage terminal to terminal is 350V peak. Maximum voltage terminal to chassis is 350V peak.

Model 7066 operation consists of three parts:

1. Wiring the Model 7066 for the desired configuration.
2. Installing the Model 7066 in a scanner mainframe.
3. Controlling the channels from the scanner.

Refer to paragraph 2.3 for wiring information, paragraph 2.4 for card installation information and the scanner instruction manual for information concerning control of the channels.

When the Model 7066(s) is the only card(s) in the scanner being used, it is recommended that the scanner be used in the 2-pole or 4-pole mode. The Model 7066 can be used with other scanner cards in any scanner pole configuration. Tables 2-2 through 2-5 list the scanner channels that control relay switch card channels for all the pole configurations of the scanner. The card numbers refer to the designated slots in the scanner where a Model 7066 may be physically located. Each table includes data for the 10 card locations in the Model 706. Since the Model 705 can only accommodate two cards, only the data for cards 1 and 2 is relevant.

#### Operation Notes:

1. To ensure the reliability of relay performance, it is recommended that not more than three relays be energized simultaneously when using the Model 705 Scanner. In the Model 706, the number of relays that can be energized simultaneously depends on factors such as temperature and ventilation. Refer to Table 2-15 in the Model 706 Instruction Manual and use the data for the Model 7053 card since those relays consume the same power as the relays for the Model 7066.
2. Power Limits—To prevent overheating or damage to the relay contacts, never exceed the signal level specifications of the relay. Maximum voltage is 250V DC or RMS, 350V peak. The current limit is 2A DC or RMS. The power limit is 60W DC, 125VA AC using a resistive load. Reactive loads require clamping and surge limiting.

3. Reactive Loads—Operation is specified for resistive loads. Reactive loads require voltage clamping (for inductive loads) and current surge limiting (for capacitive loads) to prevent damage to the relays and to external circuitry.
  - A. Inductive Loads—Inductive reaction voltage,  $L \frac{di}{dt}$ , must be limited to less than 250V in DC circuits or 350V peak in AC circuits. Also, consider the load when determining the voltage limit. Clamping circuits that can be used are shown in Figure 2-8.
  - B. Capacitive Loads—The initial surge current from a capacitive reactive load must be limited. Figure 2-9 shows circuits that can be used to limit current surges. To protect the relay, limit current to 2A. Also consider the load when determining the current surge limit.
4. AC Mains Switching—The Model 7066 may be used to switch low power AC mains as long as the following restrictions are adhered to:
  - A. Do not exceed the signal level specifications of the card.
  - B. A 2A fuse must be used to limit current.
  - C. Line filtering must be used to limit voltage transients and RF noise. A clamping circuit to protect the card from AC mains transients is shown in Figure 2-10.
5. Switching Speed—Relay actuation time is 10msec maximum, plus mainframe programming time. Maximum relay speed is 50 cycles per second at low level loads. For maximum relay life, operating speed should be limited to 20 cycles per minute at full rated load to avoid overheating of relay contacts.

**Table 2-2. Scanner Control of Model 7066 4-Pole Mode**

Card#	Scanner Channel Numbers	7066 Relays Controlled
1, 2	01-10	1-10
3, 4	11-20	1-10
5, 6	21-30	1-10
7, 8	31-40	1-10
9, 10	41-50	1-10

NOTE: Model 705 can accomodate 2 cards; Model 706 can accomodate 10 cards.

**Table 2-3. Scanner Control of Model 7066 2-Pole Mode**

Card#	Scanner Channel Numbers	7066 Relays Controlled
1	01-10	1-10
2	11-20	1-10
3	21-30	1-10
4	31-40	1-10
5	41-50	1-10
6	51-60	1-10
7	61-70	1-10
8	71-80	1-10
9	81-90	1-10
10	91-100	1-10

NOTE: Model 705 can accomodate 2 cards; Model 706 can accomodate 10 cards

**Table 2-4. Scanner Control of Model 7066 1-Pole Mode**

CARD 1		CARD 2		CARD 3		CARD 4		CARD 5	
Scanner Ch. No.	Relay Controlled								
01, 02	1	21, 22	1	41, 42	1	61, 62	1	81, 82	1
03, 04	2	23, 24	2	43, 44	2	63, 64	2	83, 84	2
05, 06	3	25, 26	3	45, 46	3	65, 66	3	85, 86	3
07, 08	4	27, 28	4	47, 48	4	67, 68	4	87, 88	4
09, 10	5	29, 30	5	49, 50	5	69, 70	5	89, 90	5
11, 12	6	31, 32	6	51, 52	6	71, 72	6	91, 92	6
13, 14	7	33, 34	7	53, 54	7	73, 74	7	93, 94	7
15, 16	8	35, 36	8	55, 56	8	75, 76	8	95, 96	8
17, 18	9	37, 38	9	57, 58	9	77, 78	9	97, 98	9
19, 20	10	39, 40	10	59, 60	10	79, 80	10	99, 100	10

**Table 2-4. Scanner Control of Model 7066 1-Pole Mode (Cont.)**

CARD 6		CARD 7		CARD 8		CARD 9		CARD 10	
Scanner Ch. No.	Relay Controlled								
101, 102	1	121, 122	1	141, 142	1	161, 162	1	181, 182	1
103, 104	2	123, 124	2	143, 144	2	163, 164	2	183, 184	2
105, 106	3	125, 126	3	145, 146	3	165, 166	3	185, 186	3
107, 108	4	127, 128	4	147, 148	4	167, 168	4	187, 188	4
109, 110	5	129, 130	5	149, 150	5	169, 170	5	189, 190	5
111, 112	6	131, 132	6	151, 152	6	171, 172	6	191, 192	6
113, 114	7	133, 134	7	153, 154	7	173, 174	7	193, 194	7
115, 116	8	135, 136	8	155, 156	8	175, 176	8	195, 196	8
117, 118	9	137, 138	9	157, 158	9	177, 178	9	197, 198	9
119, 120	10	139, 140	10	159, 160	10	179, 180	10	199, 200	10

NOTE: Model 705 can accomodate 2 cards; Model 706 can accomodate 10 cards.

**Table 2-5. Scanner Control of Model 7066 Matrix Mode (0-Pole)**

CARD 1		CARD 2		CARD 3		CARD 4		CARD 5	
Scanner Ch. No.	Relay Controlled								
01, 1	1	06, 1	1	11, 1	1	16, 1	1	21, 1	1
01, 2	6	06, 2	6	11, 2	6	16, 2	6	21, 2	6
02, 1	2	07, 1	2	12, 1	2	17, 1	2	22, 1	2
02, 2	7	07, 2	7	12, 2	7	17, 2	7	22, 2	7
03, 1	3	08, 1	3	13, 1	3	18, 1	3	23, 1	3
03, 2	8	08, 2	8	13, 2	8	18, 2	8	23, 2	8
04, 1	4	09, 1	4	14, 1	4	19, 1	4	24, 1	4
04, 2	9	09, 2	9	14, 2	9	19, 2	9	24, 2	9
05, 1	5	10, 1	5	15, 1	5	20, 1	5	25, 1	5
05, 2	10	10, 2	10	15, 2	10	20, 2	10	25, 2	10

**Table 2-5. Scanner Control of Model 7066 Matrix Mode (0-Pole) (Cont.)**

CARD 6		CARD 7		CARD 8		CARD 9		CARD 10	
Scanner Ch. No.	Relay Controlled								
26, 1	1	31, 1	1	36, 1	1	41, 1	1	46, 1	1
26, 2	6	31, 2	6	36, 2	6	41, 2	6	46, 2	6
27, 1	2	32, 1	2	37, 1	2	42, 1	2	47, 1	2
27, 2	7	32, 2	7	37, 2	7	42, 2	7	47, 2	7
28, 1	3	33, 1	3	38, 1	3	43, 1	3	48, 1	3
28, 2	8	33, 2	8	38, 2	8	43, 2	8	48, 2	8
29, 1	4	34, 1	4	39, 1	4	44, 1	4	49, 1	4
29, 2	9	34, 2	9	39, 2	9	44, 2	9	49, 2	9
30, 1	5	35, 1	5	40, 1	5	45, 1	5	50, 1	5
30, 2	10	35, 2	10	40, 2	10	45, 2	10	50, 2	10

NOTE: Model 705 can accomodate 2 cards; Model 706 can accomodate 10 cards.

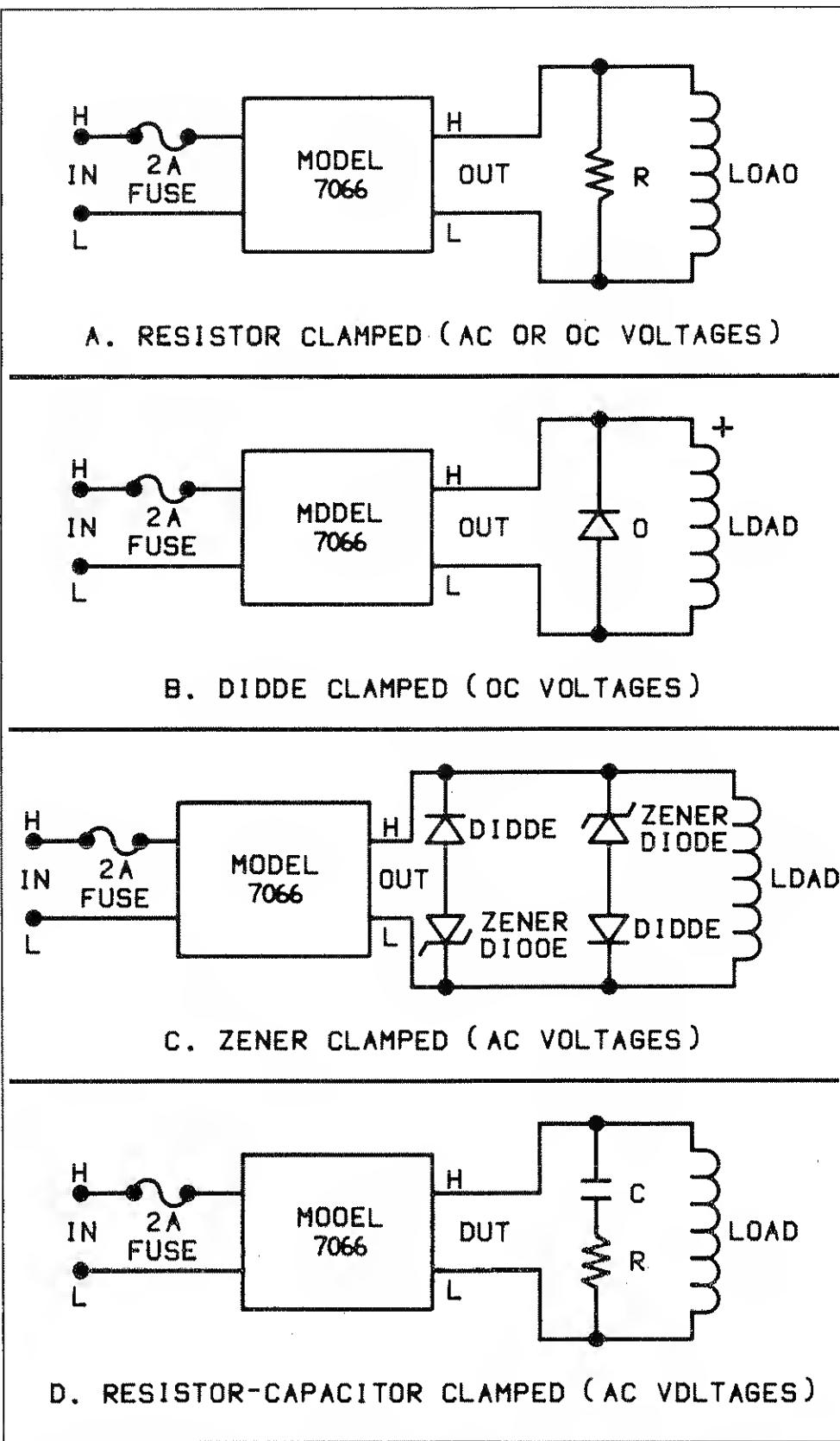


Figure 2-8. Limiting Inductive Reaction Voltage

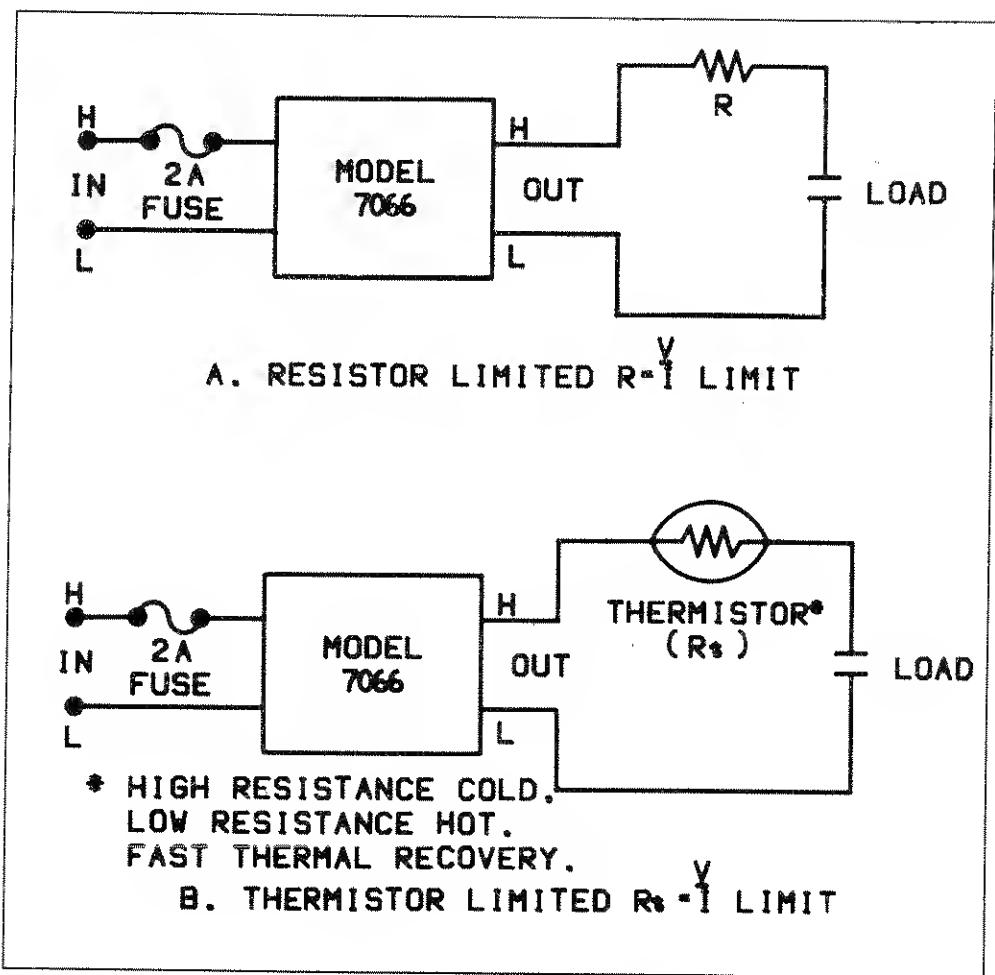
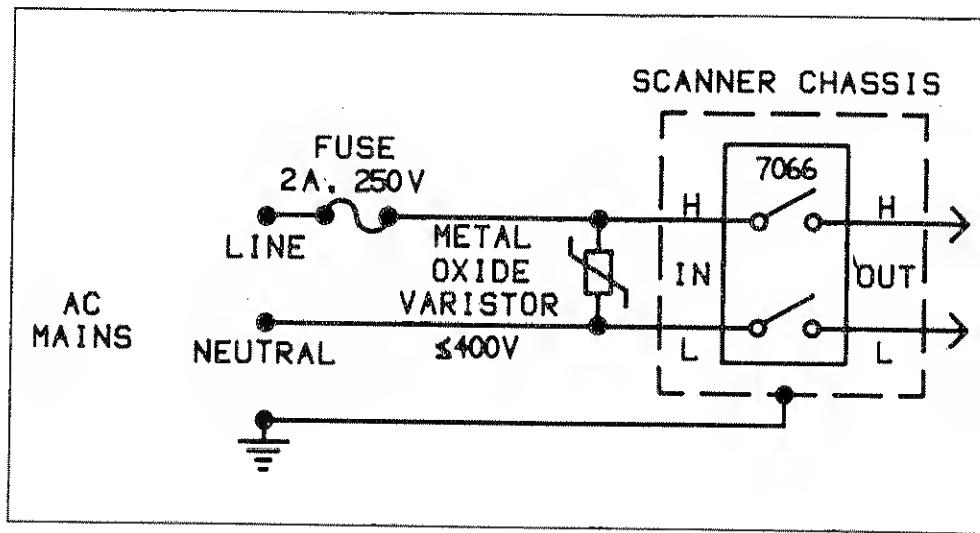


Figure 2-9. Limiting Capacitive Reaction Current



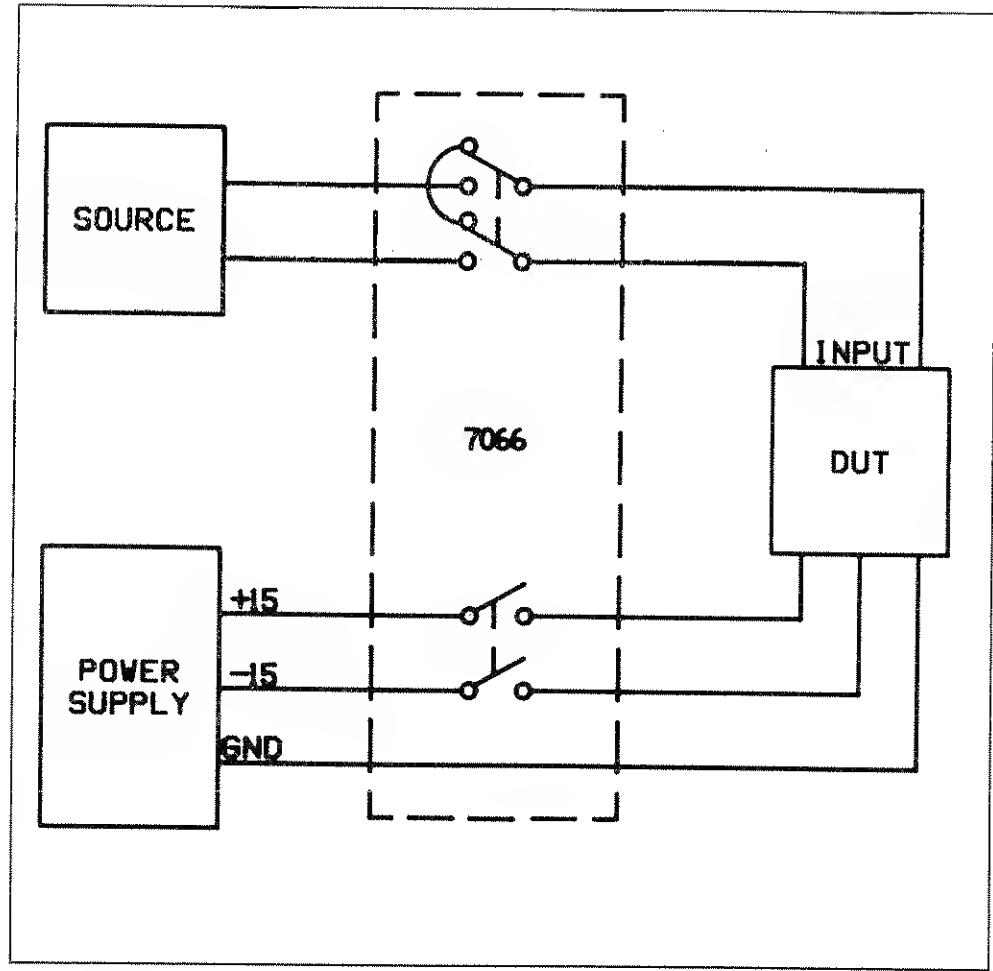
**Figure 2-10. Clamping AC Mains Transients**

## 2.6 TYPICAL APPLICATIONS

Independent IN/OUT circuits for each channel, and the flexibility of normally open (NO) or normally closed (NC) contacts provide the means to configure the Model 7066 for particular setups. This section provides some typical examples on how the relay switch card can be used.

### 2.6.1 Switching Sources and Supplies

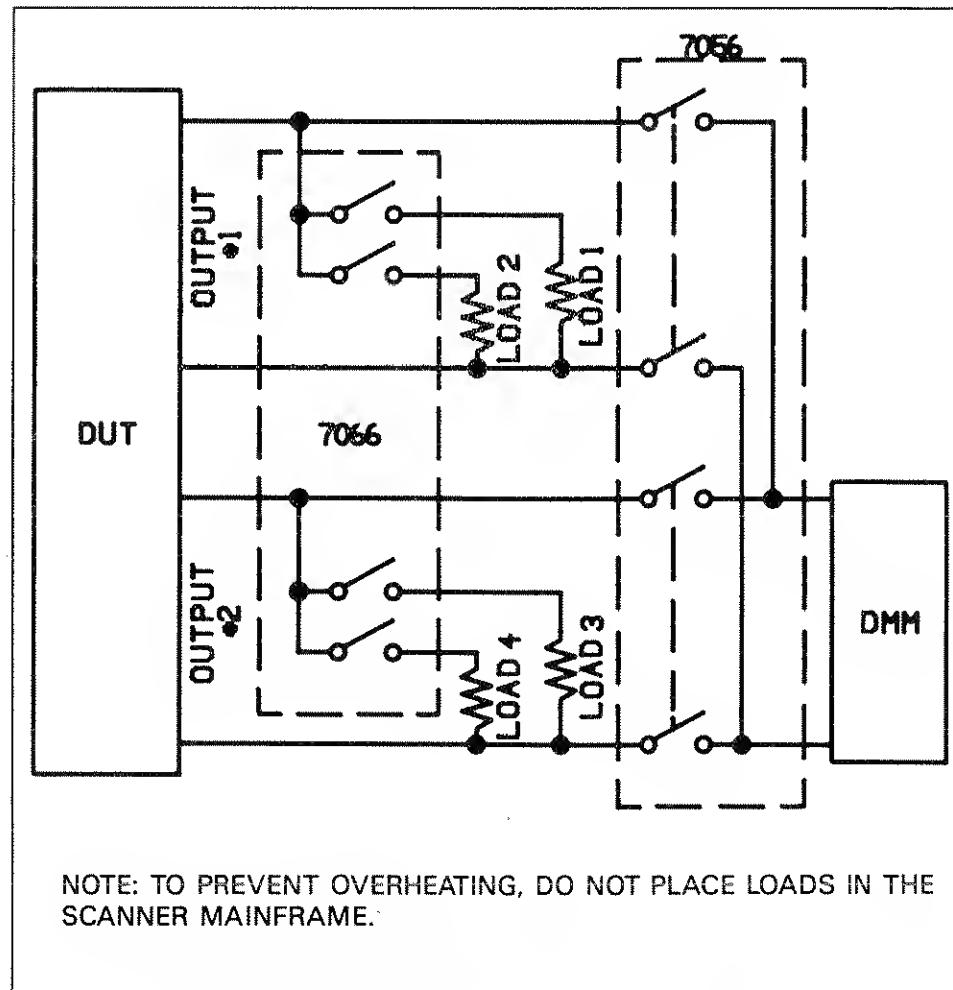
The circuit shown in Figure 2-11 controls a power supply that powers the internal circuitry of the device under test (DUT), while a second relay is used to switch the input of the DUT from a short condition to the level of the source.



**Figure 2-11. Switching Sources and Supplies**

### 2.6.2 Switching Loads

The circuit shown in Figure 2-12 uses the Model 7066 to control two separate outputs of a DUT to their loads, while a Model 7056 General Purpose Scanner Card is used to switch the DMM from one load to another. This application shows how the Model 7066 can be used with other scanner cards.



**Figure 2-12. Switching Loads**

### 2.6.3 Other Applications

The Model 7066 can be used to activate indicators, alarms and external control circuitry (i.e. activating a relay circuit that is used to start a motor).

## SECTION 3 SERVICING INFORMATION

### 3.1 INTRODUCTION

This section contains a performance verification procedure. Recommended maintenance includes inspection of the relay card and the card edge connector to ensure good electrical contact, and the verification of the input isolation and contact resistance specifications. The Model 7066 does not require calibration.

### 3.2 REQUIRED TEST EQUIPMENT

Recommended test equipment for performance verification is provided in Table 3-1. Test equipment other than the recommended equipment may be substituted if specifications equal or exceed the stated specifications in Table 3-1.

**Table 3-1. Recommended Test Equipment**

Description	Specification	Mfg.	Model
Scanner Mainframe	—	Keithley	705 or 706
DMM	200M $\Omega$ full scale ( $\pm 2\%$ ), 100m $\Omega$ resolution ( $\pm 0.05\%$ )	Keithley	175

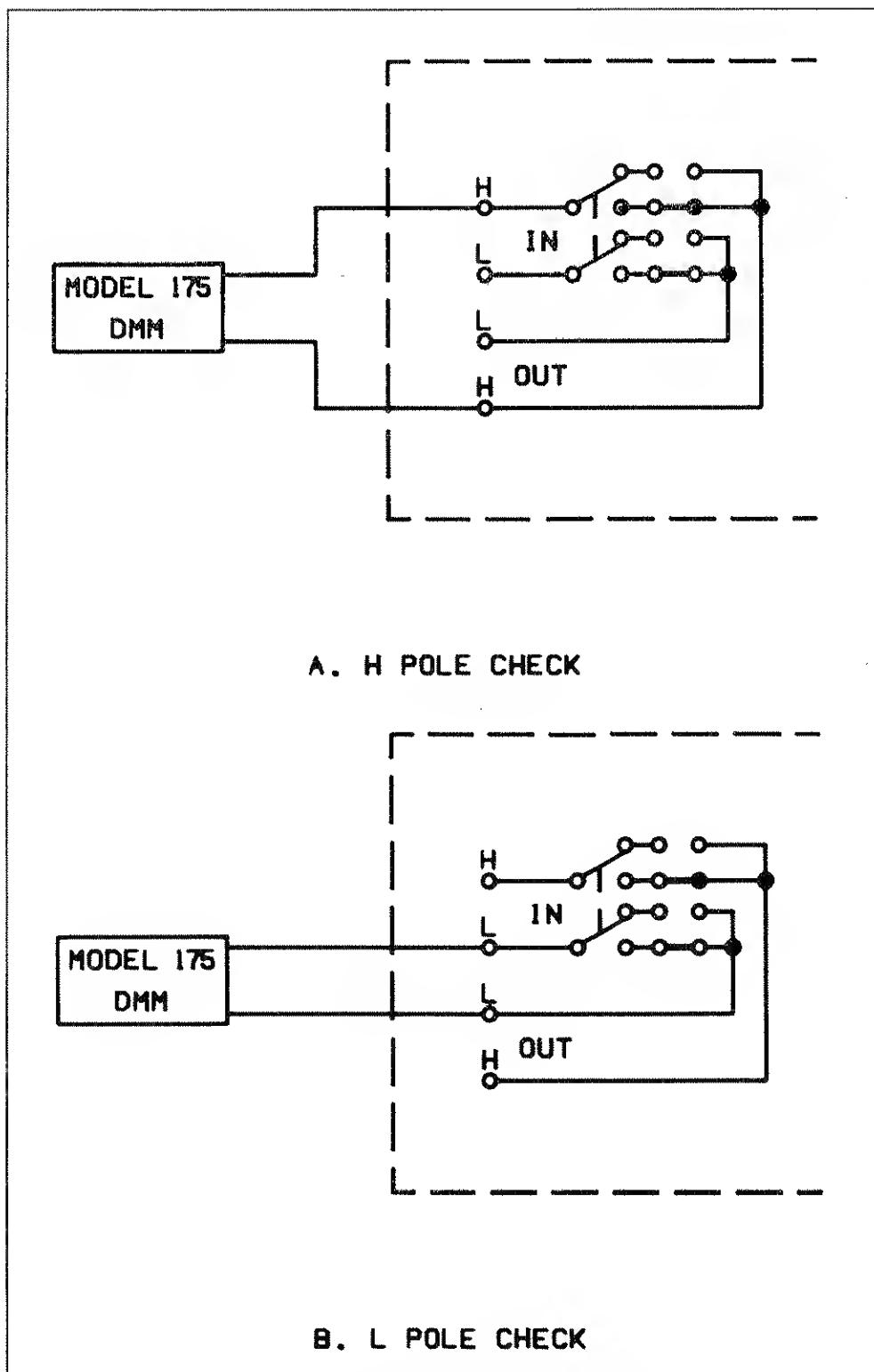
### 3.3 ENVIRONMENTAL CONDITIONS

Performance verification should be done in an environment that is within the specified operating temperature range of the relay card.

### 3.4 VERIFICATION PROCEDURE

In general, verification consists of measuring the resistance of each relay switch in an open and closed state. Perform the following procedures to verify the input isolation and contact resistance specifications of the Model 7066:

1. Connect four wires to one of the quick-disconnect terminal blocks. This one block will be used to check all 10 channels.
2. Connect the terminal block to a channel on the relay card.
3. Install the Model 7066 in a scanner mainframe.
4. Referring to Figure 3-1(A), connect the DMM to the H terminals of the relay.
5. Turn on the scanner and the DMM.
6. Select the ohms function on the DMM and open the appropriate channel from the front panel of the scanner.
7. If the relay switch is normally open (NO), verify that the input isolation is  $>200M\Omega$ . If the relay switch is normally closed (NC), verify that the contact resistance is  $<2\Omega$ .
8. Close the channel from the front panel of the scanner.
9. If the relay switch is NO, verify that the contact resistance is  $<2\Omega$ . If the relay switch is NC, verify that the input isolation is  $>200M\Omega$ .
10. Referring to Figure 3-1(B), connect the DMM to the L terminals of the relay.
11. Repeat steps 6 through 9 to check the L switch of the relay.
12. Turn off the scanner and pull out the relay card from the mainframe.
13. Remove the terminal block from the channel just checked and connect it to the next channel to be checked.
14. Repeat the above basic procedure (steps 2 through 13), to check each channel.



**Figure 3-1. Performance Verification Setup**

## **SECTION 4**

## **REPLACEABLE PARTS**

### **4.1 INTRODUCTION**

This section contains replacement parts information, a schematic diagram and a component layout for the Model 7066.

### **4.2 REPLACEABLE PARTS**

Parts are listed alpha-numerically in the order of their circuit designations.

### **4.3 ORDERING INFORMATION**

To place an order or to obtain information concerning replacement parts, contact your Keithley representative or the factory. See the back cover for addresses. When ordering, include the following information:

1. Model Number
2. Serial Number
3. Part Description
4. Circuit Description (if applicable)
5. Keithley Part Number

### **4.4 FACTORY SERVICE**

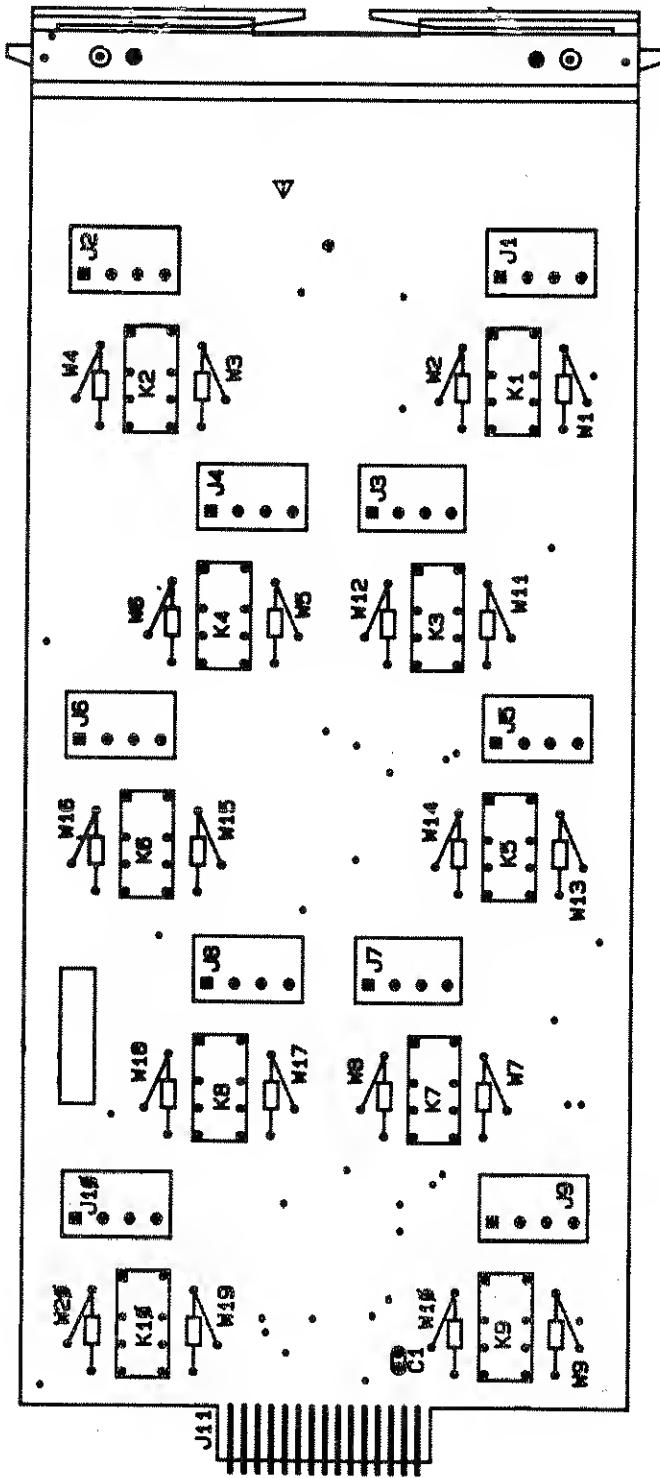
If fault can be isolated to a particular scanner card, then it is sufficient to return just the card(s). Otherwise, send back both the card(s) and scanner mainframe. For service, photo copy and complete the service form which follows this section and return it with the equipment.

## 4.5 COMPONENT LAYOUT and SCHEMATIC DIAGRAM

Figure 4-1 contains a component layout of the Model 7066. Figure 4-2 contains a schematic diagram of the Model 7066.

**Table 4-1. Model 7066, Parts List**

Circuit Desig.	Description	Sch. Loc.	Keithley Part No.
C1	Capacitor, 0.1 $\mu$ F	D7	C-237-1
J1-J10	Terminal Block	Sev.	CS-521-3
K1-K10	Relay	Sev.	RL-98
W1-W20	Jumper	Sev.	J-3
	Cable Clamp Assembly, Upper	—	7055-303-11
	Cable Clamp Assembly, Lower	—	7055-308



**Figure 4-1. Model 7066, Component Location Drawing**